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New Genera and Species of Peristerniinae (Gastropoda: Fasciolariidae) from the Caribbean Region, with Comments on the Fasciolariid Fauna of Bermuda

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Abstract. Three new genera of *Latirus*-like gastropods from the western Atlantic are described and distinguished from *Hemipolygona*, *Polygona*, and *Pustulatirus*, all peristerniine genera with sympatric species in the region, and from *Fusolatirus* of the Indo-west Pacific. The new genera are: *Lanellilatirus*, type species *Fusus cerauidus* Dall, 1889a, formerly classified in *Fusiuus*, Recent, southern Caribbean Sea; *Lightbournus*, type species *L. russjeuseui* sp. nov., Recent, Bermuda; and *Bullockus*, type species *B. guesti*, Recent, Bermuda; *Bullockus pseudovarai* sp. nov., Recent, eastern Bahamas, is also described. Other species reclassified in *Bullockus* are *Latirus (Hemipolygona) uicmurrayi* Clench and Aguayo, 1941, from northern Cuba and the Bahamas; *Latirus (Latirus) varai* Bullock, 1970, from eastern Cuba; and *Hemipolygona houkeri* Snyder, 2006, from the Bahamas and southwestern Caribbean Sea. Species of *Bullockus* generally live in upper slope depths (183–550 m), although one occurrence of *B. guesti* from 51 m is known. Pleistocene and Recent records of *Latirus brevicaudatus* (Reeve, 1847) at Bermuda are disproved; Pleistocene occurrence of *Leucozonia uassa* (Gmelin, 1791) at Bermuda is confirmed; and Pleistocene and Recent records of *Fasciolaria* spp. at Bermuda remain unconfirmed.

INTRODUCTION

Western Atlantic species of the fasciolariid subfamily Peristerniinae customarily have been classified in only two genera, *Latirus* Montfort, 1810, and *Leucozonia* Gray, 1847 (e.g., Bullock, 1974; Vermeij and Snyder, 2002; Mallard and Robin, 2005). However, recent studies of peristerniine taxa world-wide have reclassified many species formerly in *Latirus* to other genera such as *Beuiuakia* Habe, 1958 (Vermeij and Snyder, 2003) and *Fusolatirus* Kuroda and Habe, 1971 (Snyder and Callomon, 2005; Snyder and Bouchet, 2006). Vermeij and Snyder (2006) further restricted *Latirus* to a relatively few Indo-west Pacific species, raised *Polygona* Schumacher, 1817 and *Heuipolygona* Rovereto, 1899, both formerly considered subgenera of *Latirus*, to full generic rank, and introduced the new generic names *Pustulatirus* and *Turrilatirus* to accommodate other species formerly classified in *Latirus*. These studies prompted reassignment of nearly all western Atlantic species formerly assigned to *Latirus* to *Polygona*, *Heuipolygona*, *Beuiuakia*, or *Pustulatirus*, most by Vermeij and Snyder (2006).

One western Atlantic species whose classification has not been addressed in those studies is *Fusus cerauuidus* Dall, 1889a. This species has usually been classified in the genus *Fusiuus* Rafinesque, 1815 (e.g., Hadorn and Rogers, 2000), but Sunderland and Sunderland (1995) proposed that the shell seemed more like that of *Latirus*, and Snyder (2003) noted that a review of western Atlantic *Latirus* by Bullock (1968; unpublished M.Sci. thesis) had indeed placed the species in that genus. Bullock's account confirmed that the species is peristerniine and, by criteria in use at that time, was appropriately placed in *Latirus*, but it is excluded from that genus by contemporary criteria.

To ascertain a proper generic assignment for "*Latirus*" *cerauuidus*, we examined shells from the type locality, Barbados, and from another reported population at Bermuda. This examination convinced us that no generic name currently in use is appropriate for this species, so we introduce a new generic name for it. "*Latirus*" *cerauuidus* is redescribed, and evidence pertinent to its generic distinctiveness is discussed. The Bermuda material was found not to be "*L.*" *cerauuidus* but rather to consist of two previously undescribed species which we also describe. These species, both apparently endemic to Bermuda, are

designated as type species of two other new genera, one containing several additional Caribbean species, including another newly described here. The other new genus is monotypic. It is possible that these genera are deep-water derivatives of *Hemipolygona*.

METHODS

Specimens were examined from several institutional and private collections, identified by prefixes of catalogue numbers or collectors' initials (see Abbreviations). Shells were measured to the nearest 0.1 mm using vernier calipers. Unless otherwise stated, reported sizes are shell height (greatest length).

Abbreviations

ANSP – Academy of Natural Sciences of Philadelphia, PA.
BMSM – Bailey-Matthews Shell Museum, Sanibel, FL.
DMNH – Delaware Museum of Natural History, Wilmington, DE.
FLMNH – Florida Museum of Natural History, Gainesville, FL.
HGL – Collection of Harry G. Lee, Jacksonville, FL.
KLS – Collection of Kevan & Linda Sunderland, Sunrise, FL.
MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, MA.
RH – Collection of Roland Hadorn, Lyss, Switzerland.
Sh – empty (dead) shell.
USNM – National Museum of Natural History, Smithsonian Institution, Washington, D.C.
WGL – Collection of William G. Lyons, St. Petersburg, FL.

SYSTEMATICS

Class Gastropoda Cuvier, 1795
Family Fasciolariidae J. E. Gray, 1853
Subfamily Peristerniinae Tryon, 1880

Lamellilatirus gen. nov.

Type species: *Fusus ceramidus* Dall, 1889a, Recent, Barbados, designated herein.

Diagnosis: Peristerniine gastropods with fusiform shells of small to medium size (adult lengths to 51.0 mm); whorls sculpted with moderate to strong axial ribs and less prominent spiral cords; sutures distinct, bordered anteriorly by prominent, dense band of lamellae; siphonal canals relatively short, slender, canted to left; aperture ovate, constricted anteriorly and posteriorly, with parietal shield bearing very weak, oblique columellar plicae and outer lip bearing internal lirae that are entire posteriorly but interrupted as beaded dots and dashes (*sensu* Vermeij and Snyder, 2006) anteriorly on mature specimens; radula of *Latirus*-type (see Cernohorsky, 1972:156–159 for examples of *Latirus*-type and *Peristernia*-type radulae).

Etymology: *Lamellilatirus*, masculine, is a compound word formed of *lamella*, Latin, the diminutive of *lamina*, or plate, in reference to the prominent subsutural lamellae of the shells, and the stem name *Latirus*, to acknowledge the place of the genus among the "Latirus-like" taxa.

Remarks: *Lamellilatirus* is distinguished from *Fusinus*, where the type species was previously placed, by its peristerniine rather than fusinine radula (see Figure 3) and by having faint but definite oblique columellar folds (noted by Bullock (1968: 60)); shells of *Fusinus* lack columellar folds. Its relatively light-weight shells bearing conspicuous subsutural axial lamellae and faint oblique columellar plicae distinguish *Lamellilatirus* from other *Latirus*-like genera, most of which have heavier shells with well-developed, near-perpendicular columellar plicae. Shells of some species of the Indo-west Pacific genus *Fusolatirus* resemble those of *Lamellilatirus* but differ by having a *Peristernia*-like radula (see Snyder and Bouchet (2006: fig. 3k) for the radula of *Fusolatirus*).

Abbott (1974) incorrectly classified *Fusinus ceramidus*, the type species of *Lamellilatirus*, in the subgenus *Barbarofusus* Grabau and Shimer, 1909, which has been considered a subgenus or synonym of *Fusinus* or of *Heilprinia* Grabau, 1904. Shells of *Barbarofusus* lack columellar folds and subsutural lamellae, and their protoconchs are prominently ribbed on all whorls, whereas the protoconch of *F. ceramidus* is essentially smooth except for a few fine riblets near the junction with the teleoconch. Bullock (1968) and Sunderland and Sunderland (1995) proposed that *Fusus ceramidus* is more appropriately classified in *Latirus*, and Bullock (1968) proposed a manuscript name for a subgenus of *Latirus* with *ceramidus* as its type species. We chose not to validate that name because Bullock intended it collectively to represent several species that we do not believe represent a natural species-grouping.

Lamellilatirus ceramidus (Dall, 1889a)

Figures 1–2

Fusus ceramidus Dall, 1889a: 14, 171; Dall, 1890: 318, 359, pl. 6, fig. 6; Grabau, 1904: 74, 75; Lewis, 1965: 1067; Boss *et al.*, 1968: 70; Bullock, 1968: 59, 106, 107, pl. 8, fig.7; Hadorn & Rogers, 2000: 14; Snyder, 2003: 64.

Latirus ceramidus: Bullock, 1968: 59–61, 96, 106, pl. 3, figs. 5, 8.

Fusinus ceramidus: Abbott, 1974: 230, 231, text-fig. 2530; Lyons, 1978: 87; Abbott & Dance, 1982: 189,

row 1, right fig. (4); Sander & Lalli, 1982: 313, 316, fig. 2; Snyder, 1984: 28, 30; Habe & Okutani, 1985: 193, row 1, right fig. (4); Sunderland & Sunderland, 1995: 18, 2 figs.; Goto & Poppe, 1996: 388; Hadorn, 1996: 18, 23, 24, fig. 1; Hadorn, 1997: 14; Hadorn & Rogers, 2000: 14, 39, 52, pl. 4, figs. 40, 41; Mallard & Robin, 2005: 11, pl. 18; [*non Fusinus ceramidus* (Dall, 1889), *auctt.*, Bermuda, = *Lightbournus russjenseni* n. sp.].

Fusinus (Barbarofusus) ceramidus: Abbott, 1974: 230.

Fusinus caramidus [*sic*] "(Dall)": Santos Galindo, 1977: 188; Snyder, 2003: 61.

Fusinus ceramicus [*sic*] "(Dall)": Santos Galindo, 1977: 188; Snyder, 2003: 64.

Fusinus ceramidas [*sic*]: Okutani, 1983: 24.

Types examined: Lectotype, 46.2 mm, with operculum, *Blake* stn 290, Barbados, 13°11′54″N, 59°38′45″W, depth 134 m, USNM 87069; 2 paralectotypes, 18.7 & 11.3 mm, *Blake* stn 273, Barbados, 13°03′05″N, 59°36′18″W, 188 m, USNM 87068.

Other material examined: 5 sh, 39.0, 31.2, 30.0, 30.0 & 24.3 mm, in front of Bellair Research Institute, St. James coast, Barbados, depth 220 m, ANSP 416323; 6 sh, 51.0, 36.1, 31.3, 26.3, 19.4 & 19.2 mm, in front of Bellair Research Institute, St. James coast, Barbados, ANSP 416324; 4 sh, 43.7, 40.1, 39.7 & 35.3 mm, off west coast of Barbados, depth 165 m, dredged, ANSP 416371; 2 sh, 36.4 & 14.5 mm, west coast of Barbados, depth 90 m, WGL; 1 sh, 17.6 mm, west of Barbados, depth 166 m, WGL; 1 sh, 31.1 mm, off Barbados, depth 202 m, dredged, WGL.

Type locality: Barbados, 13°11′54″N, 59°38′45″W, depth 134 m.

Description: Shell broadly fusiform, color pale orange-pink to white, length to 51.0 mm, with about 9–10 whorls. Protoconch of about 2 whorls, tip incurved and flat, sides convex but not expanding, first 1–3/4 whorls smooth, glassy, final 1/4 whorl with 2–4 axial riblets, junction with teleoconch distinct. Teleoconch with as many as 8 rounded, subtabulate, rapidly expanding whorls ornamented with axial ribs, spiral cords, and subsutural lamellae. Suture well defined by convexity of surrounding whorls, undulating slightly in accord with adjacent axial ribs and intercostal areas, bordered anteriorly by prominent, densely imbricated axial lamellae beginning on about third teleoconch whorl and continuing to anterior end of body whorl. Axial ribs prominent, broad, extending from suture to suture on first 2–3 whorls, beginning anterior to subsutural lamellae on subsequent whorls; usually 6 ribs on all whorls, less commonly 7 or 8 on penultimate and body whorls of some shells. Spiral cords generally low, broadest atop axial ribs, narrowest near centers of intercostal areas; first three whorls with 2–3 primary cords crossing axial ribs and 3–4 fine threads between cords; primary cords increasing by intercalation to 5 by about whorl 6, third cord strongest, creating shoulder angle on that and subsequent whorls, posterior-most cord weaker than others; about 6 primary cords on penultimate whorl, secondary threads by now weakened and barely perceptible; body whorl subquadrate, defined by shapes of large axial ribs, ribs not continuing onto siphonal process; about 9–11 spiral cords on body whorl, some considerably stronger than others.

Aperture ovate to subquadrate, constricted at posterior sinus and at junction with siphonal canal. Parietal wall thin, smooth, concave, with 1–4 weak, oblique folds near anterior end of columella and rather weak node at edge of posterior sinus, folds and nodes sometimes absent on immature shells. Outer lip thin, broadly arcuate, slightly crenulated by termini of spiral cords, internal wall with about 12–16 lirae, those toward posterior side generally smooth and entire, those toward anterior side often periodically constricted or interrupted as dashes and dots; smooth area separating tips of lirae from edge of outer lip. Anterior end of aperture constricted by anteriormost columellar plica and prominent node on inside of outer labral wall in mature shells.

Siphonal canal of mature shells moderately long, slightly curved and canted to left in apertural view, smooth within; parietal margin distinct, slightly raised, forming narrow pseudoumbilicus near tip; 12–14 thin, oblique spiral cords crossed by numerous fine axial growth increments continuing from base of body whorl to tip.

Operculum of lectotype ovo-elongate, subreniform, dimensions 10.6 × 5.5 mm, corneous, brown, with terminal nucleus; outer surface covered with densely packed microscopic growth lines; inner surface smooth, with large, ovate muscle scar surrounded by thick callus, about 6 distinct concentric growth increments evenly spaced across surface.

Radula: see Figure 3, after Bullock (1968: 107, pl. 8, fig. 7).

Distribution: Western Atlantic Ocean; southern Caribbean Sea at Barbados, Colombia, Panamá, and Nicaragua; depth range 73–220 m.

Remarks: Shells of *Lamellilatirus ceramidus* are readily separable from all other western Atlantic Peristerniinae by the combination of characters stated in the generic diagnosis. However, *L. ceramidus* shells show an interesting resemblance to several species of *Fusolatirus* from the Indo-west Pacific, especially *F. elsiae* (Kilburn, 1975) of southeastern Africa. Subsutural lamellae on shells of *L. ceramidus* are much more prominent than those on shells of *F. elsiae*, and the radula of *F. elsiae* (see Snyder and Bouchet, 2006:2, fig. 1-L) is

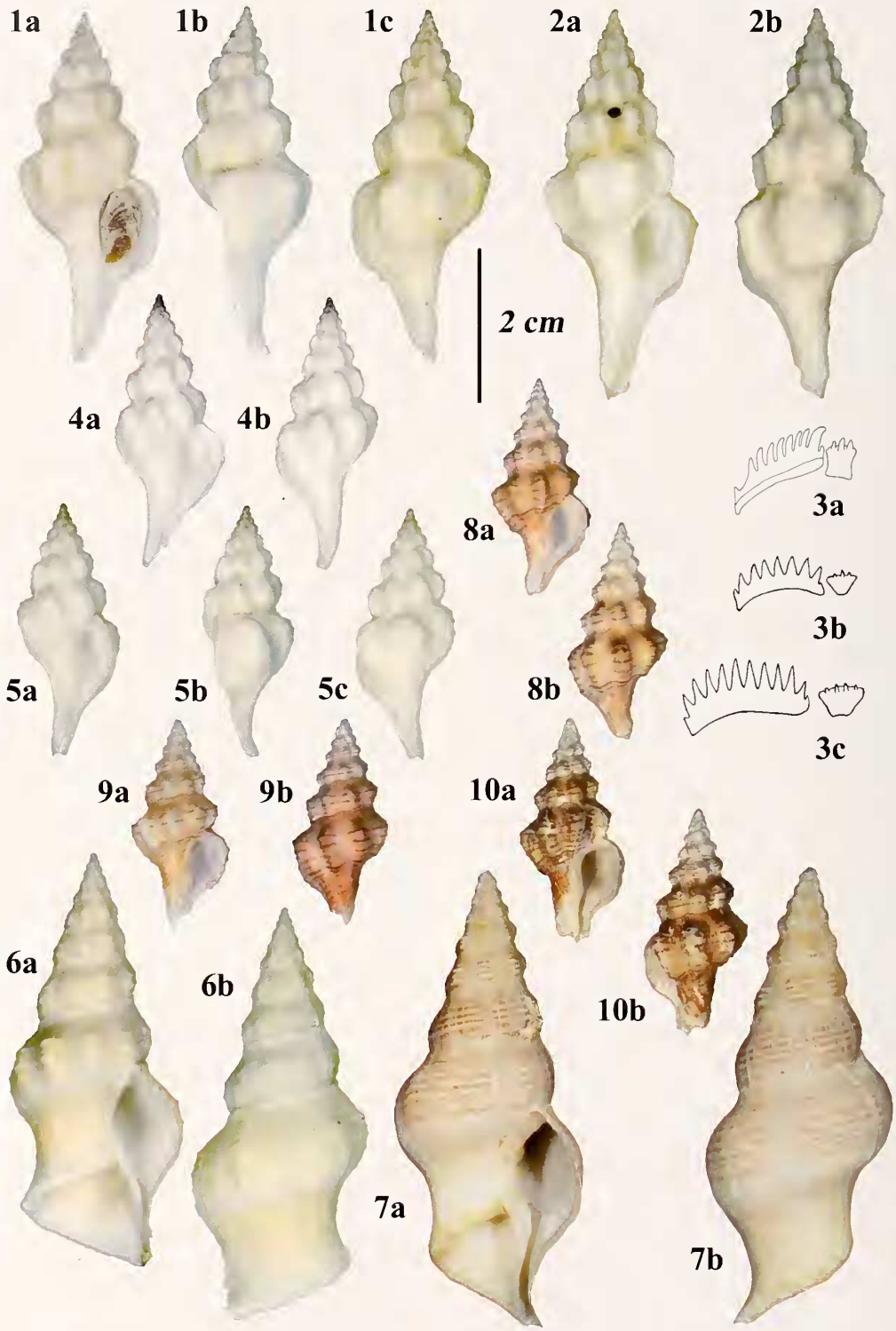

Figure 1. *Lamellilatirus ceramidus* (Dall, 1889a), lectotype, 46.2 mm, Barbados, 13°11′ 54″ N, 59°38′45″ W, depth 134 m, USNM 87069.
Figure 2. *Lamellilatirus ceramidus* (Dall, 1889a), 51.0 mm, in front of Bellair Research Institute, St. James coast, Barbados, depth 220 m, ANSP 416323.
Figure 3a. *Lamellilatirus ceramidus* (Dall, 1889a), radula (after Bullock, 1968:pl. 8 fig. 7).
Figure 3b,c *Fusinus colus* (Linnaeus, 1758), radula (after Barnard, 1959:fig. 19j); (b) is from an immature specimen and (c) is from a mature specimen.

decidedly *Peristernia*-like, whereas the radula of *L. ceramidus* (Figure 3) is not.

The illustration of a specimen (USNM 87069) as the holotype of *Fusinus ceramidus* (Dall, 1889a) by Abbott and Dance (1982; 1986) constituted a valid designation of lectotype according to International Code of Zoological Nomenclature Article 74b then in effect (ICZN, 1985), so a similar but later designation by Hadorn and Rogers (2000) was redundant. Dall (1890) chose this same shell to illustrate the species, and Bullock (1968) figured it as the holotype. We did not examine the two paralectotypes (MCZ 7240) that were examined by Hadorn and Rogers (2000), but we did examine the 7.2-mm syntype (MCZ 7239) that those authors identified as a probable juvenile of an unidentified *Fusinus* species. We concur that the shell is not conspecific with *Fusus ceramidus*, but we are not confident that it can be assigned to *Fusinus* or even to Fasciolariidae.

Most valid records of *Lanellilatirus ceramidus* have involved the population at Barbados, but Hadorn and Rogers (2000) also reported three specimens trawled off Panamá, Nicaragua, and the Colombian Basin; photographs of the latter two specimens provided to us by Hadorn confirm their identities as *L. ceramidus*.

Records of this species at Bermuda (Snyder, 1984, 2003; Hadorn and Rogers, 2000; Mallard and Robin, 2005) are incorrect and involve one or two species that we describe as new below.

Lightbournus gen. nov.

Type species: *Lightbournus russjenseni*, sp. nov., Recent, Bermuda, designated herein.

Diagnosis: Peristerniine gastropods with small fusiform shells (lengths to 35.7 mm) and smooth, paucispiral protoconchs; whorls sculpted with broad, strong axial ribs and less prominent spiral cords; sutures distinct, not bordered by spiral threads or axial lamellae; aperture ovate, constricted anteriorly and posteriorly; parietal shield of mature shells with distinct posterior node, columella with several low but distinct, oblique folds near anterior end; inside of outer lip with well-developed lirae that are paired and entire in posterior half of aperture, unpaired and somewhat interrupted in anterior half; siphonal canal slender, moderately extended, canted to left in apertural view; operculum and radula unknown.

Etymology: The genus name is masculine and honors J. R. H. "Jack" Lightbourn of Hamilton, Bermuda, whose ardent pursuit of Bermuda mollusks is commemorated by this and several other taxa.

Remarks: *Lightbournus*, known only by its type species, is readily distinguished from *Lanellilatirus*, with which it has been confused, by its lack of subsutural lamellae; although species of both genera have oblique columellar plicae, those of *Lanellilatirus* are broader, lower, and much less distinctly defined than those of *Lightbournus*. The anterior location and low, oblique shape of the columellar plicae distinguish species of *Lightbournus* from species of *Hemipolygona*, *Polygona*, and *Pustulatirus*, other western Atlantic *Latirus*-like genera whose columellar plicae are generally stronger, aligned more nearly perpendicular, and situated higher on the columella (see Figure 19).

Lightbournus russjenseni sp. nov.

Figures 4–5

Fusinus ceramidus: Snyder, 1984: 28, 30; Hadorn & Rogers, 2000: 14 (in part); Mallard & Robin, 2005: pl. 18, fig.; [*non Lanellilatirus ceramidus* (Dall, 1889a)].

Fusus ceramidus: Snyder, 2003: 64 (in part); [*non Lanellilatirus ceramidus* (Dall, 1889a)].

Type material: Holotype, 35.7 mm, south shore of Bermuda, depth 200–240 m, traps, ANSP 416321. Paratypes: 5 sh, 33.2, 30.2, 29.9, 27.8 & 25.0 mm, 0.8 km southeast of St. Davids, south shore of Bermuda, depth 293–366 m, USNM 819198; 1 sh, 28.2 mm, 2.4 km south of Gurnet Rock, south shore of Bermuda, depth 200–240 m, traps, ANSP 416375; 2 sh, 30.3 & 26.2 mm, same locality and depth, ANSP 416374; 1 sh, 26.9 mm, same data, KLS; 1 sh, 20.7 mm, south shore of Bermuda, depth 180–240 m, traps, ANSP 416376; 3 sh, 30.3, 26.4 & 25.7 mm, 4.0 km off

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Figure 4. *Lightbournus russjenseni* sp. nov., holotype, 35.7 mm, in traps off south shore of Bermuda, depth 220–240 m, ANSP 416321.
Figure 5. *Lightbournus russjenseni* sp. nov., paratype, 33.1 mm, in traps, Bermuda, depth 220 m, BMSM 15070.
Figure 6. *Bullockus mcmurrayi* (Clench & Aguayo, 1941), 42.9 mm, off West End, Grand Bahama, depth 214 m, WGL.
Figure 7. *Bullockus mcmurrayi* (Clench & Aguayo, 1941), 60.0 mm, off West End, Grand Bahama, depth 402–420 m, BMSM 26305.
Figure 8. *Bullockus guesti*, sp. nov., holotype, 28.6 mm, trapped with hermit crab off south shore of Bermuda, depth 220 m, FLMNH 41161.
Figure 9. *Bullockus guesti*, sp. nov., paratype, 27.2 mm, in traps 2.4 km south of Gurnet Rock, south shore of Bermuda, depth 200–250 m, ANSP 416322.
Figure 10. *Bullockus guesti*, sp. nov., 29.7 mm, dived south of Tucker's Town, Bermuda, depth 51 m, USNM 1100736.

south shore of Bermuda, depth 220 m, DMNH 096984; 2 sh, 28.8 & 25.7 mm, same data, DMNH 187105; 1sh, 29.0 mm, same data, DMNH 096993; 2 sh, 28.6 & 26.1 mm, same data, DMNH 202581; 1 sh, 26.5 mm, offshore of Bermuda, traps, DMNH 212752; 1 sh, 34.4 mm, Bermuda, depth 220 m, traps, HGL; 1 sh, 33.1 mm, same data, BMSM 15070; 1 sh, 32.0 mm, same data, FLMNH 41160; 2 sh, 33.0 & 29.4 mm, Bermuda, depth 220 m, traps, WGL.

Type locality: Off south shore of Bermuda, depth 200–240 m.

Description: Adult shell of moderate size, length to 35.7 mm, uniformly white, with nearly ten rapidly expanding, well-separated convex whorls. Protoconch relatively slender, of about 2-1/4 to 2-1/2 elevated whorls, first two whorls glassy, smooth, final 1/4 to 1/2 whorl with 3 or 4 rather broad axial riblets, junction with teleoconch abrupt. Nearly 8 teleoconch whorls each bearing 7, occasionally 8, broad, well-developed axial ribs crossed by less conspicuous spiral cords. Axial ribs extending from anterior suture nearly to posterior suture, slightly shouldered posteriorly, more strongly developed toward anterior suture, increasing in size anteriorly, continuing undiminished over body whorl. Suture well-defined, undulating slightly in accord with adjacent ribs and intercostal areas, rarely with faint crenulations caused by growth increments on posterior edge of adjacent anterior whorl. Spiral cords smooth, beginning at junction with protoconch; first teleoconch whorl with 4 cords, weaker 2 on posterior slope, stronger 2 crossing axial ribs, more swollen on ribs than in intercostal areas; number of cords increasing by intercalation anteriorly, about 3–4 weak ones on slope and 6 stronger ones on ribs of penultimate whorl; about 12–14 cords of more or less even strength on body whorl, continuing anteriorly onto siphonal process.

Aperture ovate-elongate, constricted near posterior sinus and at intersection with siphonal canal. Parietal wall concave, smooth, with 1–3 low, oblique folds (plicae) near anterior end of columella and single prominent node at posterior sinus. Outer lip arcuate, finely crenulate in accord with termini of spiral cords, internal wall with 10–12 prominent to weak lirae, those toward posterior half of aperture often paired, entire, those toward anterior side on mature shells often interrupted into dashes or raised dots; lirae terminating in swollen tips before reaching edge of outer lip of mature shells, interval between tips and edge smooth. Constriction at anterior end of aperture formed by anteriormost columellar fold and prominent node on labral wall of larger shells.

Siphonal canal well developed, moderately long, canted to left in apertural perspective, smooth within, with distinct parietal margin and 10–12 thin, oblique spiral cords on outer surface, cords diminishing in strength toward tip.

Operculum and radula unknown.

Etymology: The species name honors the late Russell H. "Russ" Jensen (1918–2001), former Emeritus Head of the Mollusk Department of the Delaware Museum of Natural History and a specialist on the Mollusca of Bermuda.

Distribution: Western Atlantic Ocean; known only at Bermuda, depth range 180–366 m.

Remarks: We did not ascertain how the USNM paratypes of *Lightbournus russjenseni* were collected, but all other specimens we examined were shells brought by hermit crabs into traps set in deep water as described by Lightbourn (1991). Snyder's (1984) report of *Fusinus ceramidus* in depths of 183–366 m was based on shells of *L. russjenseni*, including some listed among our material examined and was the basis for Snyder's (2003) inclusion of Bermuda in the range of *Fusus ceramidus*. More recently, Mallard and Robin (2005) published two color photographs of a Bermudan shell of *L. russjenseni* that they identified as *Fusinus ceramidus*. Hadorn and Rogers (2000) also included Bermuda within the range of *F. ceramidus*, but without indicating the source of their information; their record was probably of *L. russjenseni*. *Lightbournus russjenseni* may also have been represented among shells that Lightbourn (1991) listed as *Latirus brevicaudatus*; we examined a few *L. russjenseni* among shells received (by MAS) from Lightbourn as *L. brevicaudatus*, but most of those shells represent another new species described later in this paper.

Bullockus gen. nov.

Type species: *Bullockus guesti* sp. nov., Recent, Bermuda, designated herein.

Diagnosis: Peristerniine gastropods with broadly fusiform shells of small to large size for subfamily (lengths 30–82 mm); whorls sculpted with moderate to strong axial ribs and less prominent spiral cords; sutures incised, lacking adjacent cords or lamellae; siphonal canals relatively short, slender, canted to left, with shallow pseudoumbilicus near tip; apertures ovate, constricted anteriorly and posteriorly, with parietal shields with columellar plicae absent, rudimentary, or developed only on largest mature shells; and outer lips of mature shells bearing internal lirae interrupted as dashes or dots.

Etymology: The genus name is masculine and honors Dr. Robert C. Bullock, University of Rhode Island, Kingston, RI, whose earlier studies of western Atlantic *Latirus*-like taxa paved the way for our study.

Remarks: Species of *Bullockus* differ from other *Latirus*-group species by the combination of characters defined in the diagnosis. Species other than the type species that we classify in *Bullockus* include *Latirus (Hemipolygona) mcmurrayi* Clench and Aguayo, 1941, from northern Cuba and the northwestern Bahama Islands, depths 214–420 m (Clench and Aguayo, 1941; Lan, 1993; Sunderland and Sunderland, 1996; Petuch, 2002; Snyder, 2006; this report); *Hemipolygona honkeri* Snyder, 2006, from the southwestern Caribbean Sea and the eastern Bahamas, depths 245–550 m (Snyder, 2006); *Latirus (Latirus) varai* Bullock, 1970, from northeastern Cuba, depth 183 m (Bullock, 1974); and *Bullockus pseudovarai* sp. nov., from the eastern Bahama Islands, depths 245–550 m. All of these species share features of the columella and suture that characterize *Bullockus*.

The type species previously was mistaken for a species of *Polygona* Schumacher, 1817, but shells of that genus have prominent, near-perpendicular columellar plicae and sutures bordered with spiral cords, wrinkles, axial lamellae, or often all three. The other included species previously were classified with *Latirus* Montfort, 1810, and *Hemipolygona* Rovereto, 1899, but are distinguished from *Latirus* by having shells with angulate whorls bearing distinct spiral cords and subovate apertures and from *Hemipolygona* by lacking distinct columellar plicae and by having sutures that are finely incised between the smooth surfaces of adjacent whorls, without adjacent cords, wrinkles or lamellae.

Latirus mcmurrayi differs from other species of *Bullockus* by having a shell with an often remarkably expanded umbilicus. This is a variable feature in several latirid genera. Similar aberrations are found in some specimens of *Hemipolygona recurvirostris* (Schubert & Wagner, 1829). Some shells of *L. mcmurrayi* have a few weak, oblique folds or even small, tooth-like plicae near the anterior end of the columella, but on most shells the columella is as featureless as that of the type species of *Bullockus*; that feature and the complete lack of ornamentation around the suture prompt us to place the species in *Bullockus*. Vermeij and Snyder (2006: 417) had tentatively placed this species in *Hemipolygona*.

We observed several kinds of variation among eleven specimens of *B. mcmurrayi* that we examined: holotype, 52.2 mm, off Matanzas, Cuba, 348 m, MCZ 135285; 1 sh, 73.5 mm, off Matanzas, Cuba, 400–420 m, KLS; 1 sh, 55.7 mm, off Tamarind, Grand Bahama Island, ANSP 368995; 2 sh, 52.3 & 39.7 mm, off Tamarind, Grand Bahama, 214 m, KLS; 1 sh, 42.9 mm, off West End, Grand Bahama, 214 m, WGL; 1 sh, 54.5 mm, off West End, 408–421 m, WGL (Figure 6); 1 sh, 41.5 mm, off West End, 26°38′N, 78°59′W, 420 m, ANSP 416377; and 3 sh, 48.6 mm (BMSM 26298), 39.0 mm (BMSM 26299) & 60.0 mm (BMSM 26305; Figure 7), all off West End, Grand Bahama, 402–420 m. The holotype and KLS shells from off Matanzas, Cuba, have weak spiral cords, causing them to appear smoother than most Bahamian shells, but cords on the WGL and two of the three BMSM shells from off West End are nearly as weak as the Cuban specimens. The columella of the holotype lacks any indication of plicae, but the other shell from off Matanzas, by far the largest specimen examined at 73.5 mm, has three low, tooth-like plicae at the anterior end of the columella; one to three rather vague columellar folds are present on the nine shells from Grand Bahama. Finally, the holotype is darkly stained (by mud?) and the large KLS shell from off Matanzas is grayish-white, but most shells from Grand Bahama are uniformly light yellow; the exceptions, two shells from off West End (BMSM 26299 & 26305; Figure 7) are covered with horizontal brown bands caused by the presence of that color over all areas not occupied by white spiral cords.

Features of *Hemipolygona honkeri* that prompt us to reclassify the species in *Bullockus* are discussed in remarks for *B. guesti*. Similarly, features of *Latirus varai* that place it in *Bullockus* are discussed with the account for *B. pseudovarai*.

Bullockus guesti sp. nov.

Figures 8–10

[?] *Latirus* sp. near *sanguifluus* "Rve." Peile, 1926: 82; Bullock, 1974: 76; [*non Latirus sanguifluus* (Reeve, 1847), Recent, Polynesia, = *Turrilatirus sanguifluus*, *fide* Vermeij & Snyder, (2006: 419)].

Latirus brevicaudatus (Reeve, 1847). Waller, 1973: 43; Lightbourn, 1991: 5; [*non Latirus brevicaudatus* (Reeve, 1847), = *Polygona brevicaudata* (Reeve, 1847), *fide* Vermeij and Snyder (2006: 420)].

Type material: Holotype 28.6 × 12.8 mm, off south shore of Bermuda, depth 220 m, trapped with hermit crab, FLMNH 41161. Paratypes: 29.7 × 13 mm, south of Tucker's Town, Bermuda, depth 51 m, dived by T. Waller, USNM 1100736; 1 sh, 27.2 mm, 2.4 km south of Gurnet Rock, south shore of Bermuda, depth 200–250 m, traps, ANSP 416322; 4 sh, 25.1, 23.1, 18.7 & 16.2 mm, south shore of Bermuda, depth 180–240 m, traps, ANSP 416373; 1 sh, 20.3 mm, same data, BMSM 15071; 1 sh, 19.3 mm, same data, KLS; 1 sh, 22.0 mm, same locality, 200–240 m, traps, ANSP 416372; 1 sh, 19.4 mm, 4.0 km off south shore of Bermuda, depth 220 m, traps, DMNH 234001; 2 sh, 20.3 & 18.5 mm, south of Gurnet Rock, Bermuda, depth 220 m, DMNH 187106; 1 sh, 21.2 mm, Bermuda, depth 220 m, traps, WGL.

Description: Shell solid, broadly fusiform, to 29.7 mm long, 13.0 mm wide, with about 10 whorls. Protoconch smooth, glassy, of about 2 whorls, with rounded tip and convex sides; final 1/2 whorl with 3–5 axial riblets of increasing strength; junction with teleoconch abrupt. Teleoconch pale orange, sometimes faded nearly white, of about 8 rapidly expanding, sharply angled whorls, with prominent axial ribs, less prominent orange-brown spiral cords, and a well-marked suture. Axial ribs about 8 per whorl, broad, abutting anterior suture and extending to, but not over, posterior sutural ramp. First teleoconch whorl with about 3 spiral cords of equal size; cords increasing by intercalation to 6 or more on second and later whorls, including about 4 smaller cords on sutural ramp and posterior halves of ribs and 2 larger cords on anterior halves of ribs, sometimes with another cord adjacent to anterior suture; 3–4 largest cords on each whorl colored dark orange-brown, contrasting with lighter background color of teleoconch; body whorl with as many as 12 dark cords, 2 cords at periphery strongest. Suture well-marked, undulating in accord with ribs and intercostal areas, without subsutural lamellae.

Aperture ovate to subquadrate; parietal wall smooth, concave, distinctly demarked on mature shells, with node-like callus at posterior sinus; columella without plicae but terminating in (usually) sharp angle at junction with siphonal canal. Outer lip arcuate, finely crenulate in accord with termini of spiral cords, internal wall with 8–10 well-developed lirae, posterior lirae entire, anterior ones interrupted as dashes or dots on mature shells, lirae not extending to lip edge; node at anterior end usually prominent, uncommonly reduced, together with columellar terminal angle forming constriction between aperture and siphonal canal.

Siphonal canal rather short, slender, canted to left in apertural view, smooth within; edge of parietal callus distinct, raised on larger shells, forming shallow, chink-like pseudoumbilicus near anterior tip; about 7 dark or lighter smooth oblique cords continuing from base of body whorl to tip.

Operculum (of paratype USNM 11000736) ovate, brown, corneous, dimensions 5.4 × 3.6 mm, nucleus terminal, with concentric growth increments on upper surface and muscle scar bordered by conspicuous callus beneath, callus wider and thicker near nucleus. Radula unknown.

Distribution: Western Atlantic Ocean; known only at Bermuda, depth range 51–250 m.

Etymology: The species name honors the late Arthur Tucker Guest, O. B. E. (1907–1993), retired customs officer and student extraordinaire of the shells of Bermuda, who was instrumental in collecting and distributing most shells that we examined.

Remarks: Except for the USNM paratype collected at a depth of 51 m using scuba (Waller, 1973:fig. 11), all specimens we examined of *Bullockus guesti* were occupied by hermit crabs taken in traps set in deeper water as described by Lightbourn (1991). The depth of collection of Waller's specimen is much shallower than any other recorded for the species and is the only depth where a living specimen has been collected.

Shells of *B. guesti* have been confused with *Polygona brevicaudata* (Reeve, 1847). Although their shells are similar in general profile, in sculpture of the axial ribs, and particularly in having orange-brown spiral cords, *P. brevicaudata* can be distinguished by having distinct, well-developed, near-perpendicular plicae on its columella and rugose wrinkles, often overlain by fine axial lamellae, just anterior to its suture.

The only reports of *Latirus* living at Bermuda involve Peile's (1926) uncertain listing of "*Latirus* sp. near *sanguifluus* (Rve.)," Waller's (1973) listing of *Latirus brevicaudatus* from a depth of 51 m off the southern coast, and Lightbourn's (1991) mention of crabbed shells of *L. brevicaudatus* among specimens trapped in deep waters off the southern coast. Bullock (1974) proposed that Peile's record may have been based on *Latirus angulatus* (Röding, 1798), in which he included *L. brevicaudatus* as a junior synonym. "*Latirus*" *sanguifluus* (Reeve, 1847), reclassified as *Turrilatirus sanguifluus* by Vermeij and Snyder (2006), is a Polynesian species endemic to the Tuamotu and Marquesas Archipelagos (Salvat and Rives, 1975) and is unlikely to occur at Bermuda. Bullock (1974) also proposed that Waller's record of *L. brevicaudatus* represented *L. angulatus*, but we re-examined that specimen (USNM 1100736), which is *B. guesti*.

The "*L. brevicaudatus*" of Lightbourn is also *B. guesti*, as evidenced by shells received from Lightbourn and Guest, and all specimens except Waller's that we examined originated from that source. Thus, it seems likely that all reports of Recent *P. brevicaudata* at Bermuda were actually of *B. guesti*. Reports of *L. brevicaudatus* in Bermuda Pleistocene deposits are errors for a species of *Leucozonia* (see discussion).

Shells of *Bullockus guesti* most resemble those of *B. honkeri*, (Figure 14), but shells of the latter species are uniformly yellow and larger (to 55.5 mm, versus 29.7 mm for *B. guesti*), with larger protoconchs, whorls with more prominent spiral cords, colored the same as other exterior surfaces, that protrude and create the appearance of points where they cross axial ribs, and several inconspicuous folds on the columella.

***Bullockus pseudovarai* sp. nov.**

Figures 11,13

Latirus varai: Snyder, 2006: 41; [*non Latirus (Latirus) varai* Bullock, 1970, Recent, northeastern Cuba].

Figure 11. *Bullockus pseudovarai*, sp. nov., holotype, 82.3 mm, off San Salvador, Bahama Islands, depth 488 m, ANSP 416379.
Figure 12. *Bullockus varai* (Bullock, 1970), possible paratype, 57.2 mm, off Gibara, Oriente Province, Cuba, depth 183 m, K.L.S.
Figure 13. *Bullockus pseudovarai*, sp. nov., paratype, 64.7 mm, off San Salvador, Bahama Islands, depth 220–550 m, ANSP 416378.
Figure 14. *Bullockus honkeri* (Snyder, 2006), holotype, 39.6 mm, off San Salvador, Bahama Islands, depth 245–550 m, ANSP 413204.

Hemipolygona varai: Snyder, 2006: 44, pl. 1, figs. 1a–d, 2a–d; [*non Latirus (Latirus) varai* Bullock, 1970].

Type material: Holotype 82.3 × 27.7 mm, from off San Salvador, Bahama Islands, depth 488 m, ANSP 416379; paratype 64.7 mm, off San Salvador, Bahamas, depth 220–550 m, ANSP 416378.

Type locality: Off San Salvador, eastern Bahama Islands, 488 m.

Description: Shell solid, relatively large (to 82.3 × 27.7 mm) fusiform, with about 11 whorls. Protoconch of about 2 smooth, glassy whorls, with rounded tip and convex sides, about 4 axial riblets on final 1/2 whorl; junction with teleoconch abrupt. Teleoconch white with prominent orange-brown axial ribs and other patches of similar color scattered on body whorl; about 9 postnuclear whorls increasing in size anteriorly; axial ribs well developed, 7 ribs on early whorls, increasing to 8 by about whorl 5; ribs aligned in transverse rows between whorls beginning at about whorl 5. Spiral cords 3 on first whorl, of about equal size, anterior-most 2 cords stronger than others thereafter, creating "squared" effect where they cross ribs and conferring tabulate appearance to spire; number of cords increasing to 4 on about whorl 5, with some barely perceptible secondary threads between, middle 2 cords strongest, resembling points where they cross ribs; about 11 cords of varying strength on body whorl, 2 cords at shoulder much stronger than others. Suture incised, distinct, undulating slightly in accord with adjacent ribs and interspaces, bordered above and below by essentially smooth shell surfaces interrupted only by very fine, irregularly spaced axial growth increments.

Aperture ovate, white, with slight anterior and posterior constrictions; parietal wall essentially smooth, concave, slightly thicker at posterior sinus; columella bearing single, inconspicuous, oblique fold, arching anteriorly in gradual transition to siphonal process. Outer lip arcuate, marked with 2 points near shoulder and lesser crenulations elsewhere in accord with termini of spiral cords of body whorl; internal wall with as many as 20 lirae of unequal size, some terminating before others, none extending to edge of lip, termini of farthest extending lirae punctuated with extra dots at end; prominent node at anterior edge of liral array, forming constriction at entrance to siphonal process.

Siphonal canal rather short, slender, canted to left in apertural view, smooth within; inner edge (continuation of parietal wall) distinct, raised, forming shallow, slender pseudoumbilicus near anterior tip; about 8 white, oblique cords continuing from base of body whorl to tip, diminishing in strength anteriorly.

Operculum brown, corneous, fairly slender, curved and tapering anteriorly to terminal nucleus; outer surface marked with numerous closely packed, arc-like concentric growth increments; inner surface with muscle scar bearing concentric elliptical rings of growth, surrounded by thick ring of callus.

Radula unknown.

Etymology: The name *pseudovarai* is formed of the Greek prefix *pseudes*, meaning false, and *varai*, the name of a similar species; literally, the false *varai*, referring to a report by Snyder (2006) in which the new species was mistakenly figured and discussed as *Hemipolygona varai*.

Distribution: Western Atlantic Ocean; known only from near San Salvador, Bahama Islands, depths 220–550 m.

Remarks: Snyder (2006: 44, pl. 1, figs. 1, 2) figured two specimens of *Bullockus pseudovarai* as *Hemipolygona varai*, a closely related species from northeastern Cuba. The smaller of the specimens (64.7 mm) that Snyder figured is the paratype of the new species; the larger of the shells (75.2 mm) is in the collection of Tom Honker of Delray Beach, Florida. The only variations noted among those two shells and the holotype is that the anterior-most of the two shoulder cords on the 75.2-mm shell is somewhat weaker than the posterior cord, conferring to the whorl a less "squared" profile; the axial ribs are less aligned with each other on consecutive whorls of the 75.2-mm shell than on the other two.

Snyder (2007) shows that the name *Latirus varai* was incorrectly applied by Pointier & Lamy (1998: 131) and Mallard & Robin (2005: pl. 51) to shells from the Lesser Antilles, and Snyder has reclassified that species in the genus *Hemipolygona*. A shell from Venezuela that Mallard & Robin (2005: pl. 51) also figured as *Latirus varai* appears to be undescribed.

We believe that the only valid reports of *Latirus varai* involve the 70 mm holotype and a paratype from off Gibara, Oriente Province, Cuba, in 183 m. The holotype, MCZ 262589, has been illustrated by Bullock (1970: text-fig. 1), Abbott (1974: text-fig. 2493a), Kaicher (1978: card 1838), Abbott & Dance (1982, 1986: 186, row 1, right fig.), Petuch (1987: pl. 8, fig. 13), Snyder (2000: fig. 3), and Vermeij & Snyder (2006: 418, fig. 3A). The paratype, which remained in the collection of John Finlay of Wilmington, Delaware, has not been figured. A specimen of *Latirus varai* from off Gibara in 183 m that was acquired from Finlay by the Sunderlands was illustrated by Sunderland & Sunderland (1996: 17). We expected that shell to be the sole paratype, but its size is 57.2 mm, not 52.4 mm as reported for the paratype by Bullock. Whatever its status may be, the Sunderland shell is clearly conspecific with the holotype and we reillustrate it here (Figure 12) for comparison with *B. pseudovarai*.

Bullockus varai can be distinguished from *B. pseudovarai* by having many more white spiral cords crossing the brown axial ribs; the Sunderland shell has 5 cords crossing ribs on teleoconch whorls 3 and 4, 7 cords on whorls 5 and 6, 9 cords on whorl 7, and 12–13 cords on the body whorl. The cords are smaller and more closely spaced than those of *B. pseudovarai* and, because of their subequal size, do not create the "squared" profile seen on *B. pseudovarai*. Instead, the ribs of *B. varai* are rather evenly convex. We concur with Bullock's (1970) observation that the general appearance of the ribs of *B. varai* is much like that of *Latirus kandai* Kuroda, 1950 (= *Fusolatirus kandai*; Recent, Japan and Philippine Islands), but ribs of *B. pseudovarai* certainly do not resemble those of *F. kandai*.

Bullock (1970: 134) described four folds, "the upper one weaker," on the holotype of *B. varai*, and two of those folds are evident in the original figure. However, folds of *B. varai* are weaker, more oblique, and more anteriorly situated than are the near-perpendicular folds (plicae) of *Hemipolygona* and *Polygona* species. The Sunderland shell has no folds on its columella, evidently because it is less mature. General shell shape, including those of the protoconch, the columella, the featureless shell surfaces around the sutures, and the form of the siphonal process all dictate placement of *Latirus varai* in *Bullockus*.

DISCUSSION

All of the species treated herein have been associated at some time with *Latirus* Montfort, 1810, a generic name that has served as an umbrella for a diverse array of taxa distributed throughout tropical and subtropical regions of the world. As consequences of recent revisions noted in the introduction, many and in fact most of those species are now classified elsewhere, leaving relatively few Indo-west Pacific species and no western Atlantic species in *Latirus* (see Vermeij and Snyder, 2006). New World species until recently classified in *Latirus* are now placed in *Polygona*, *Hemipolygona*, and *Pustulatirus*, genera whose shells, together with those of *Leucozonia* and *Opeatostoma* Berry, 1958, have columellas bearing three or more well-developed, near-perpendicular plicae (Figures 15–18). Prominent columellar plicae also occur on shells of all species of the Indo-west Pacific genera *Turrilatirus*, *Latirolagena* Harris, 1897, and *Peristernia* Mørch, 1852, and on most species of *Latirus* as construed by Vermeij and Snyder (2006). These plicae are prominent even on shells not yet mature. Such plicae do not occur on species of the Indo-west Pacific genera *Benimakia* or *Fusolatirus*, nor do they occur on the new genera *Lamellilatirus* and *Lightbournus*. Plicae may occur, uncommonly, on some mature shells of *Bullockus varai*, and *B. mcmurrayi*, but most shells of that species lack plicae, and no plicae have been seen on mature shells of *B. guesti*, *B. honkeri*, or *B. pseudovarai*.

The marine molluscan fauna of Bermuda clearly is derived from the Caribbean region (Jones, 1876), but its remote location and cool winter climate seem to have acted as impediments to recruitment by many species. Groups such as the Fasciolariidae, with direct development or only brief planktotrophic larval stages, have shown very limited success recruiting to Bermuda. Although many species of Fasciolariidae are known from the Caribbean Sea and Gulf of Mexico, only three (*Fusinus lightbourni* Snyder, 1984; *Lightbournus russjenseni*, sp. nov.; and *Bullockus guesti*, sp.nov.) are known to live at Bermuda today, all in fairly deep water (~50–250 m) and all evidently endemic to Bermuda. Although we have identified no close relative of *L. russjenseni*, the nearest relative of *F. lightbourni* seems to be *F. schrammi* (Crosse, 1865) from deep water in the northeastern Antilles, and *B. guesti* belongs to a group that includes several species that live in deep waters (183–550 m) of the Bahama Islands, Cuba and the southwestern Caribbean Sea (Snyder, 2006).

If there are no shallow-water fasciolariids living at Bermuda today, historical records and reports of Pleistocene fossils suggest that a few such species reached that remote island, located ~1000 km to the east of North America (Muhs *et al.*, 2002). Shallow-water Caribbean species reported from Bermuda include *Fasciolaria distans* Lamarck, 1816 (= *Fasciolaria lilium* Fischer von Waldheim, 1807), reported by Jones (1864, 1876); *Fasciolaria tulipa* (Linnaeus, 1758), reported by Moore and Moore (1946) and Richards *et al.* (1969); *Leucozonia nassa* (Gmelin, 1791) and its junior synonym *L. cingulifera* (Lamarck, 1822), reported by Heilprin (1889), Peile (1926), and Moore and Moore (1946); and *Latirus brevicaudatus* (Reeve, 1847), reported by Richards *et al.* (1969) and Waller (1973). Dall (1889b) tentatively listed Bermuda within the range of *Leucozonia ocellata* (Gmelin, 1791), but that listing has not been substantiated. There are also two unfortunate Bermuda listings of the Indo-west Pacific *Pleuroploca trapezium* (Linnaeus, 1758) by Santos Galindo (1977: 190, 372) but those listings are obviously spurius and may be ignored.

Fasciolaria tulipa and *Leucozonia nassa* are the two most widely ranging western Atlantic fasciolariids; *F. tulipa* occurs now from northeastern Brazil to North Carolina, and *L. nassa* ranges from Trindade Island, 1140 km off the Brazilian coast (Vermeij and Snyder, 2002) and throughout central and northern Brazil to North Carolina (Nathanson, 2006). Despite limitations imposed by their modes of reproduction and dispersal, these species have demonstrated abilities to recruit over distances that seem to constitute barriers for most other

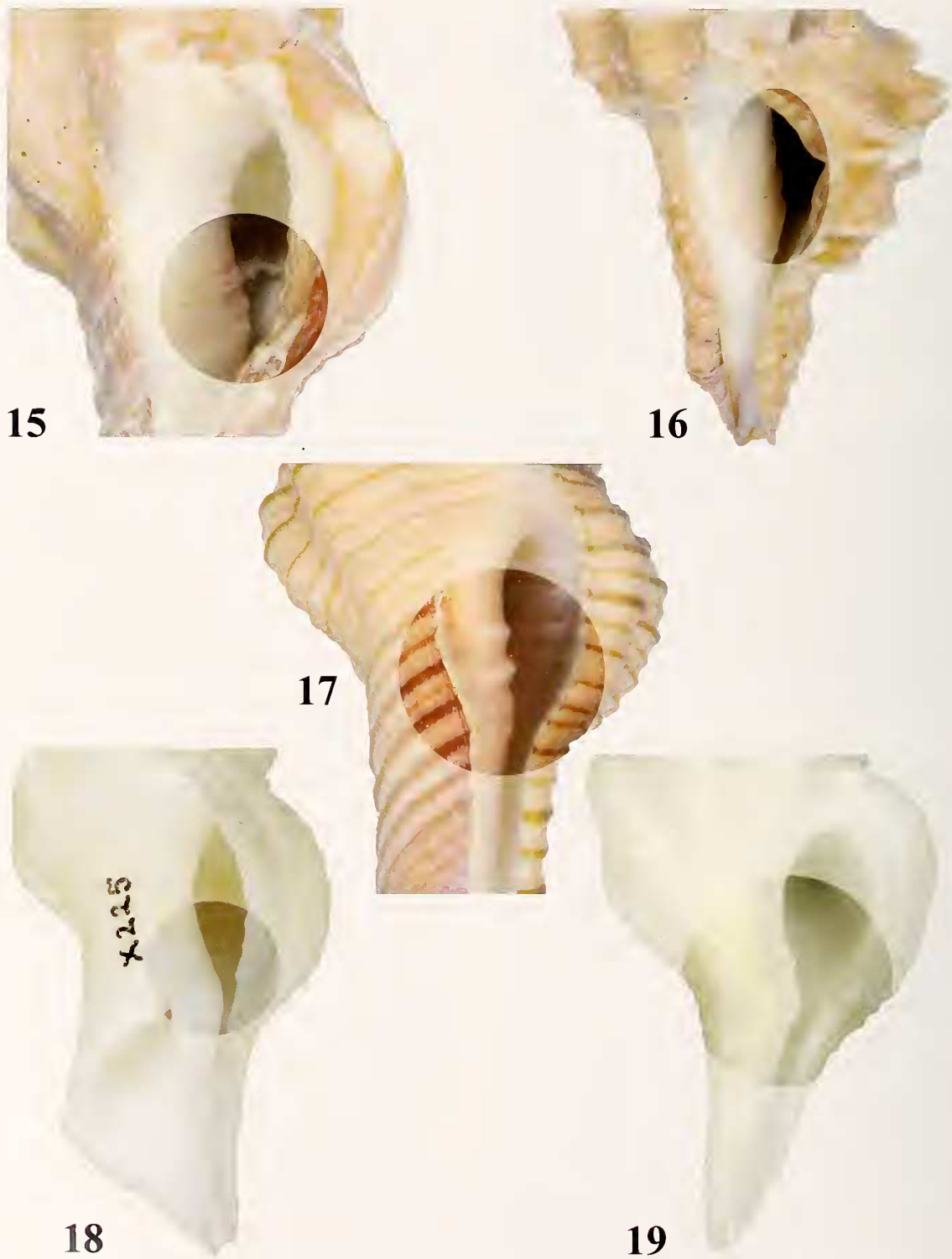

Figure 15. *Pustulatirus mediamericanus* (Hertlein & Strong, 1951), 78.0 mm, off Acapulco, Mexico, ANSP 416383.
Figure 16. *Hemipolygona armata* (A. Adams, 1855), 47.7 mm, Goree Island, Dakar, Senegal, depth 15–30 m, ANSP 416384.
Figure 17. *Polygona infundibulum* (Gmelin, 1791), 70.7 mm, Cabo de la Vela, Guajira, Columbia, depth 60 m, ANSP 416385.
Figure 18. *Bullockus mcmurrayi* (Clench & Aguayo, 1941) 55.6 mm, Tamarind, Grand Bahama Island, depth 245 m, ANSP 368995.
Figure 19. *Lightbournus russjenseni*, sp. nov., holotype, 35.7 mm, in traps off south shore of Bermuda, depth 200–240 m, ANSP 416321.

fasciolariids, so their presence in Bermuda may seem reasonable. However, although reports indicate that both species may have arrived at Bermuda from time to time, each has encountered difficulty establishing a population there.

Fasciolaria was first reported at Bermuda by Jones (1864), who cited *F. distans* as rare based on one specimen "in a semifossil state." Jones (1876) reiterated that record and added that his marine specimens had been identified by the well known conchologist C. B. Adams, although Adams died in 1853 (Abbott, 1973), more than a decade before Jones published his first list. The Jones record was repeated by Dall (1885; 1889a, b), Heilprin (1889), and Verrill (1907). Peile (1926) also repeated the fossil record of *F. distans* and added that the species still lived at Bermuda but was rarely found; Peile's was the last report of *F. distans* at Bermuda. The next record of *Fasciolaria*, by Moore and Moore (1946), reported *F. tulipa* as occurring both fossil and living at Bermuda, although the new records were implicitly of fossil shells which had been identified by W. J. Clench. Moore and Moore noted the shells to be fairly common in subsurface calcareous sandstone cut by harbor dredging from below sea level in and around Castle Harbour, the age of the sandstone being considered "preglacial" or possibly a result of rising sea level within a glacial period. Abbott (1958) later treated the report of *F. distans* by Peile (1926), and implicitly others, as *F. tulipa* and repeated earlier comments that living specimens were rare at Bermuda. Finally, Richards *et al.* (1969) reported new records of *F. tulipa* in the Pleistocene Belmont Formation (age ~200 ka; Muhs *et al.*, 2002) of Bermuda but noted that the species is not living in Bermuda waters today, an observation reinforced by Sterrer (1998). Thus, it seems to have been decided that the original report of *F. distans* as a Bermuda fossil was an error for *F. tulipa*, that the sole evidence of living *Fasciolaria* at Bermuda was Peile's unsubstantiated note, and that no species of *Fasciolaria* now lives at Bermuda.

We have not seen any museum specimens of Recent *Fasciolaria* at Bermuda, but we did examine a voucher (ANSP 59434) from Watch Hill Park, Bermuda, that Richards *et al.* (1969) reported as a Quaternary fossil of *F. tulipa*. The specimen is an upper fragment of a spire, height 25.0 mm, with its early whorls intact. The specimen is not fasciolariid but may be a fragment of a species of Cassidae, perhaps *Casmaria*. This finding refutes the only record of *Fasciolaria* at Bermuda known to be supported by physical evidence and provokes uncertainty about other Bermuda records of the genus.

Richards *et al.* (1969) also reported Bermuda Pleistocene records of *Latirus brevicaudatus* at Spencer's Point (Spencer's Point Formation, age 130,000 ± 15,000 ybp) and Grape Bay (Devonshire Formation; = Devonshire marine member of Rocky Bay Formation, age ~125 ka; Muhs *et al.*, 2002), and they noted that a report by Moore and Moore (1946) of fossil *Leucozonia cingulifera* Lamarck in Castle Harbour dredgings may instead have been *L. brevicaudatus*. Based on the report by Richards *et al.*, Muhs *et al.* (2002: 1372) cited *Latirus brevicaudatus* as one of three extralimital southern (warm-water) gastropod species that ranged northward to Bermuda during the last interglacial period but do not live around Bermuda today.

We examined specimens representing both of the Richards *et al.* records, now catalogued as *Latirus* sp. at the Academy of Natural Sciences of Philadelphia. The voucher from Spencer's Point (ANSP 61785) is a small shell fragment consisting of most of a body whorl and including the aperture and columella. Prominent features include a few large, nodose ribs on the shoulder crossed by 2 fairly prominent spiral cords, followed anteriorly by 5–6 much lower cords and 1 markedly larger cord near the anterior edge of the whorl. There are about 7 finer spiral threads on the subsutural ramp but no indication of subsutural lamellae. The columella has 3, possibly 4 near-perpendicular plicae. The voucher from Grape Bay (ANSP 61768) is a larger (36.3 × 21.2 mm), nearly intact shell missing only the anterior end of the siphonal process but encased in limestone concretions over much of the outer surface and aperture. There are about 8 node-like ribs per whorl; several small, narrow cords on the subsutural ramp are overlain by microscopic growth increments, and the columella is obscured by concretion. We compared both vouchers with Recent *Leucozonia nassa* in the ANSP collection and judge them to be conspecific.

These fossils constitute the only physical evidence we have seen of the presence of *Leucozonia nassa* at Bermuda. Heilprin (1889: 168) first reported *L. nassa* (as *L. cingulifera*) at Bermuda without comment, indicating that he did not consider the occurrence noteworthy, and Peile (1926) also listed *L. cingulifera* among Bermudan mollusks collected by him and Arthur Haycock. Moore and Moore (1946) mentioned *L. cingulifera* as rare among living fauna of Bermuda and also reported shells from two "preglacial" [Pleistocene] beds there. But then Richards *et al.* (1969) suggested that Pleistocene records by Moore and Moore were actually of *L. brevicaudatus*, casting doubt on other previous records, none of which can now be substantiated. No more reports of *L. nassa* at Bermuda since those by Moore and Moore have been forthcoming, but our findings support those earlier reports and refute the Pleistocene records of *Latirus brevicaudatus*. Having also refuted one fossil record of *Fasciolaria tulipa* by Richards *et al.* and knowing of no other specimens of that species to demonstrate its Bermuda occurrence, we conclude that *L. nassa* may be the only

shallow-water Caribbean fasciolariid species to have recruited to Bermuda since before the onset of the last ice age.

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LITERATURE CITED

ABBOTT, R. T. 1958. The marine mollusks of Grand Cayman Island, British West Indies. Academy of Natural Sciences of Philadelphia, Monograph 11:1–138, pls. 1–5.

ABBOTT, R. T. 1973. American Malacologists; first edition. American Malacologists: Falls Church, Virginia. 494 pp.

ABBOTT, R. T. 1974. American Seashells; second edition. Van Nostrand Reinhold Company, New York. 663 pp., 24 pls.

ABBOTT, R. T. & S. P. DANCE. 1982. Compendium of Seashells. E. P. Dutton, Inc.: New York. 411 pp.

ABBOTT, R. T. & S. P. DANCE. 1986. Compendium of Seashells; revised edition. American Malacologists, Inc., Melbourne, Florida. 411 pp.

ADAMS, A. 1855. Descriptions of twenty-seven new species of shells from the collection of Hugh Cumming, Esq. Proceedings of the Zoological Society of London for 1854, 311–317.

BARNARD, K. H. 1959. Contributions to the knowledge of the South African marine Mollusca. Part II. Gastropoda: Prosobranchiata: Rachiglossa. Annals of the South African Museum 45(1):1–237, 52 text figs.

BERRY, S. S. 1958. West American molluscan miscellany - II. Proposal of five new generic taxons. Leaflets in Malacology 1(16):91–98.

BOSS, K. J., J. ROSEWATER & F. A. RUHOFF. 1968. The zoological taxa of William Healey Dall. United States National Museum Bulletin 287:1–427.

BULLOCK, R. C. 1968. The fasciolariid genera *Latirus*, *Dolicholatirus*, and *Teralatirus* (Mollusca: Gastropoda) in the western Atlantic. M.Sci. thesis, University of Maine, Orono. 109 pp.

BULLOCK, R. C. 1970. *Latirus varai*, a new fasciolariid gastropod from the Caribbean. The Nautilus 83(4):133–135.

BULLOCK, R. C. 1974. A contribution to the systematics of some West Indian *Latirus* (Gastropoda: Fasciolariidae). The Nautilus 88(3):69–79.

CERNOHORSKY, W. O. 1972. Marine Shells of the Pacific, Vol. II. Pacific Publications: Sydney. 411 pp., 68 pls.

CLENCH, W. J. & C. G. AGUAYO. 1941. Notes and descriptions of new deep-water Mollusca obtained by the Harvard-Havana Expedition off the coast of Cuba. IV. Memorias de la Sociedad Cubana de Historia Natural "Felipe Poey" 15(2):177–180, pl. 14.

CROSSE, H. 1865. Descriptions d'espèces nouvelles de la Guadeloupe. Journal de Conchyliologie 13:27–38.

DALL, W. H. 1885. List of marine Mollusca comprising the quaternary fossils and Recent forms from American localities between Cape Hatteras and Cape Roque including the Bermudas. Bulletin of the United States Geological Survey 24:1–336.

DALL, W. H. 1889a. Reports on the results of dredging, under supervision of Alexander Agassiz, in the Gulf of Mexico (1877–1878) and the Caribbean Sea (1879–1880), by the U. S. Coast Survey steamer "Blake," Lieut.-Commander C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. XXIX. Report on the Mollusca. Part II. Gastropoda and Scaphopoda. Bulletin of the Museum of Comparative Zoology at Harvard College 18: 1–492, pls. 1–40.

DALL, W. H. 1889b. A preliminary catalogue of the shell-bearing marine mollusks and brachiopods of the southeastern coast of the United States, with illustrations of many of the species. Bulletin of the United States National Museum 37:1–221, pls. 1–74.

DALL, W. H. 1890. Scientific results of explorations by the U. S. Fish Commission steamer "Albatross. No. VII. – Preliminary report on the collection of Mollusca and Brachiopoda obtained in 1887–1888. Proceedings of the United States National Museum 12(773):219–362, pls. 5–14.

FISHER VON WALDHEIM, G. 1807. Muséum-Demidoff ou catalogue systématique et raisonné des curiosités de la nature et de l'art, données à l'Université Impériale de Moscou par son Excellence Monsieur Paul de Demidoff. (mis en ordre systématique et décrit par G. Fischer), Tome Troisième, Végétaux et Animaux. Moscou. ix, 330 pp., 6 pls. [Classe des Mollusques, p. 102–280].

GMELIN, J. F. 1791. Vermes. In: Caroli a Linnaei, systema naturae per regna tria naturae. Editio decima tertia, Aucta, Reformata. Lipsiae (Leipzig) 1(6):3021–3910.

GOTO, Y. & G. T. POPPE. 1996. Tools in Malacology: A Listing of Living Mollusca. Part II, Vol. 1. L'Informatore Piceno: Ancona, Italy. 520 pp.

GRABAU, A. W. 1904. Phylogeny of *Fusus* and its allies. Smithsonian Miscellaneous Collections 44(1417):iii, 1–193.

GRABAU, A. W. & H. W. SHIMER. 1909. North American Index Fossils, Invertebrates, Vol. I. A. G, Seiler & Company: New York. viii + 853 pp.

GRAY, J. E. 1847. A list of the genera of Recent Mollusca, their synonyms and types. Proceedings of the Zoological Society of London for 1847, 129–219.

GRAY, J. E. 1853. On the division of ctenobranchous gasteropodus Mollusca into larger groups and families. Proceedings of the Zoological Society of London 21:32–44, figs. 1–26. [Also published in the Annals and

Magazine of Natural History, Second Series, 11(62): 124–133, figs. 1–10].

HABE, T. 1958. On the radulae of Japanese marine gastropods (4). Venus 20(1):43–60, pls. 2, 3.

HABE, T. & T. OKUTANI. 1985. Sekai Kai-Rui Dai Zukan [Compendium of World Seashells; Japanese edition of Abbott & Dance (1982); nomenclature modified so work must be treated as original]. Heibonsha Limited: Tokyo. 445 pp.

HADORN, R. 1996. Beiträge zur Kenntnis der Gattung *Fusinus* Rafinesque 1815 (Gastropoda: Fasciolariidae), Teil I. Die karibischen Arten. Club Conchylia Informationen 28(1–2):17–24.

HADORN, R. 1997. A new species from the West Indies. *Fusinus benjamini* n. sp. (Gastropoda: Fasciolariidae). La Conchiglia 29(282):10–15.

HADORN, R. & B. ROGERS. 2000. Revision of Recent *Fusinus* (Gastropoda: Fasciolariidae) from tropical western Atlantic, with description of six new species. Argonauta 14(1):5–57.

HARRIS, G. F. 1897. Catalogue of the Tertiary Mollusca in the Department of Geology, British Museum (Natural History). Part 1. Tha Australasian Tertiary Mollusca. Trustees of the British Museum: London. Pp. v–xxvi, 1–260, pls.

HERTLEIN, L. G. & A. M. STRONG. 1951. Eastern Pacific expeditions of the New York Zoological Society. Mollusks from the west coast of Mexico and Central America. Part 10. Zoologica, Scientific Contributions of the New York Zoological Society 36:67–120, pls. 1–11.

HEILPRIN, A. 1889. The Bermuda Islands. Privately published: Philadelphia. 231 pp., 19 pls.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (ICZN). 1985. International Code of Zoological Nomenclature; third edition. University of California Press: Berkeley and Los Angeles. xx + 338 pp.

JONES, J. M. 1864. Contributions to the natural history of the Bermudas. Transactions of the Nova Scotia Institute of Natural Science 1(2):14–26.

JONES, J. M. 1876. The Visitor's Guide to Bermuda, with a Sketch of its Natural History. Reeve & Turner: London. 156 pp.

KAICHER, S. D. 1978. Fasciolariidae Part I. Card Catalogue of World-Wide Shells No. 18: cards 1753–1859.

KILBURN, R. N. 1975. Taxonomic notes on South African marine Mollusca (5), including descriptions of new taxa of Rissoidae, Cerithiidae, Tonnidae, Cassidae, Buccinidae, Fasciolariidae, Turbinellidae, Turridae, Architectonicidae, Epitoniidae, Limidae and Thraciidae. Annals of the Natal Museum 22(2):577-622, figs. 1–25.

KURODA, T. 1950. Descriptions of two new species of marine gastropods, dedicated to Mr. K. Kanda on his 77th birthday. Venus 16(1–4):49–52.

KURODA, T. & T. HABE. 1971. [Descriptions of genera and species]. In: T. Kuroda, T. Habe & K. Ōyama (eds.), The Sea Shells of Sagami Bay, xix, 741 pp. [Japanese text], 121 pls., 489 pp. [English text], 51 pp., index, map, Tōkyō: Maruzen.

LAMARCK, J. B. P. A. DE M. DE. 1816. Tableau encyclopédique et méthodique des trois règnes de la nature. Vingt-troisième partie. Mollusques et polypes divers. Veuve Agasse: Paris. 16 pp., pls. 391–488.

LAMARCK, J. B. P. A. DE M. DE. 1822. Histoire naturelle des animaux sans vertèbres... Paris 7(2):711.

LAN, T. C. 1993. The Classic Shells of the World. Published by the author: Taipei. 222 pp.

LEWIS, J. B. 1965. A preliminary description of some marine benthic communities from Barbados, West Indies. Canadian Journal of Zoology 43:1049–1074.

LIGHTBOURN, J. R. H. 1991. Dredging and trapping shells in deep water in Bermuda. American Conchologist 19(2): 4–7.

LINNAEUS, C. VON. 1758. Systema naturae per regna tria naturae. Editio decima reformata. Vol. 1. Regnum animale. Stockholm. 824, iii pp.

LYONS, W. G. 1978. *Fusinus stegeri* (Gastropoda: Fasciolariidae), a new species from the eastern Gulf of Mexico. The Nautilus 92(2):85–88.

MALLARD, D. & A. ROBIN. 2005. Fasciolariidae. Muséum du Coquillage, Les Sables d'Olonne. 27 pp., 70 pls.

MONTFORT, D. DE. 1810. Conchyliologie Systématique, et Classification Méthodique des Coquilles; offrant leurs figures, leur arrangement générique, leurs descriptions caractéristiques, leur noms; ainsi que leur synonymie en plusieurs langues. Vol. 2. F. Schoell, Librairie: Paris. 676 pp.

MOORE, H. B. & D. M. MOORE. 1946. Preglacial history of Bermuda. Bulletin of the Geological Society of America 57:207–222, 2 pls.

MØRCH, O. A. L. 1852. Catalogus conchyliorum quae reliquit D. Alphonso d'Aguirra & Gadea, Comes de Yoldi, &c. Fasciculus Primus, Cephalophora. Hafniae: Ludovici Kleini, 170 pp.

MUHS, D. R., K. R. SIMMONS & B. STEINKE. 2002. Timing and warmth of the Last Interglacial period: new U-series evidence from Hawaii and Bermuda and a new fossil compilation for North America. Quaternary Science Reviews 21(12–13):1355–1383.

NATHANSON, M. 2006. North Carolina collecting. Shell-O-Gram 47(3):3–5.

OKUTANI, T. 1983. Four new species of bivalves and a new gastropod trawled from off Surinam. Venus, The Japanese Journal of Malacology 42(1):17–25.

PEILE, A. J. 1926. The Mollusca of Bermuda. Proceedings of the Malacological Society of London 17(2–3):71–98.

PETUCH, E. J. 1987. New Caribbean Molluscan Faunas. Coastal Education and Research Foundation: Charlottesville, Virginia. 154 pp. + 4 appendix pp.

PETUCH, E. J. 2002. New deep water gastropods from the Bimini shelf, Bimini chain, Bahamas. Ruthenica 12(1):59–72.

POINTIER, J.-P. & D. LAMY. 1998. Guide des Coquillages des Antilles. PLB Editions: Guadeloupe. 225 pp.

RAFINESQUE, C. S. 1815. Analyse de la nature ou tableau de l'univers et des corps organisés. Palerme, 224 pp. [Included in: The complete writings of Constantine Smalz Rafinesque on Recent & fossil conchology edited by W.G. Binney and G.W. Tryon. New York: Bailliere Brothers. 1864. Reprinted 1984].

REEVE, A. L. 1847. [Monograph of the genus *Turbinella*]. Conchologia Iconica 4:[unpaginated text], pls. 1–13.

RICHARDS, H. G., R. T. ABBOTT & T. SKYMER. 1969. The marine Pleistocene mollusks of Bermuda. Notulae Naturae No 425: 1–10.

ROVERETO, G. 1899. Prime ricerche sinonimiche sui generi dei gasteropodi. Atti della Società Ligustica di Scienze Naturali e Geografiche 10(2):101–110.

SALVAT, B. & C. RIVES. 1975. Coquillages de Polynésie. Les Éditions du Pacifique: Tahiti. 392 pp.

SANDER, F. & C. M. LALLI. 1982. A comparative study of mollusk communities on the shelf-slope margin of Barbados, West Indies. Veliger 24(4):309–318, 1 pl.

SANTOS GALINDO, E. 1977. Index and Register of Seashells (with cross references). Librería de Porrúa Hermanos y Cía, S.A., México 1, D. F. 523 pp.

SCHUBERT, G. H. & J. A. WAGNER. 1829. Neues Systematisches Conchylien-Cabinet angefangen von Martini und Chemnitz, 12:xii, 196 pp., pls. 214–237.

SCHUMACHER, C. F. 1817. Essai d'une Nouveau Système des Habitations des Vers Testacés. Copenhagn, 287 pp., 22 pls.

SNYDER, M. A. 1984. *Fusinus lightbourni* (Gastropoda: Fasciolariidae), a new species from Bermuda. The Nautilus 98(1):28–30.

SNYDER, M. A. 2000. *Latirus beckyae*, a new species of Fasciolariidae (Neogastropoda) from Brazil. The Nautilus 114(4):161–163.

SNYDER, M. A. 2003. Catalogue of the marine gastropod family Fasciolariidae. Academy of Natural Sciences of Philadelphia, Special Publication 21. 431 pp.

SNYDER, M. A. 2006. Description of *Hemipolygona honkeri* sp. nov. from the western Atlantic Ocean and Caribbean Sea (Gastropoda: Fasciolariidae: Peristerniinae). Visaya 1(6):41–47.

SNYDER, M. A. 2007. Description of *Hemipolygona lamyi* sp. nov. from Guadeloupe, French Antilles, Caribbean Sea (Gastropoda: Fasciolariidae: Peristerniinae), with notes on the distribution of *Fusinus schrammi*. Visaya (To appear).

SNYDER, M. A. & P. BOUCHET. 2006. New species and new records of deep-water *Fusolatirus* (Neogastropoda: Fasciolariidae) from the west Pacific. Journal of Conchology 39(1):1–12.

SNYDER, M. A. & P. CALLOMON. 2005. On some *Fusolatirus* from Japan and the Philippines, with description of a new species (Gastropoda: Fasciolariidae). Venus 63(3–4):109–119.

STERRER, W. 1998. How many species are there in Bermuda? Bulletin of Marine Science 62(3):809–840.

SUNDERLAND, K. & L. SUNDERLAND. 1995. Western Atlantic *Fusinus*. American Conchologist 23(3):18, 19.

SUNDERLAND, K. & L. SUNDERLAND. 1996. Western Atlantic *Latirus*. American Conchologist 24(1):16, 17.

TRYON, G. W. 1880–1881. Manual of conchology, structural and systematic, with illustrations of the species. Volume 3. Tritonidae, Fusidae, Buccinidae. Philadelphia. 310 pp., 87 pls. [5–64, 1880; 65–310, 1881]

VERMEIJ, G. J. & M. A. SNYDER. 2002. *Leucozonia* and related genera of fasciolariid gastropods: Shell-based taxonomy and relationships. Proceedings of the ANSP 152:23–44.

VERMEIJ, G. J. & M. A. SNYDER. 2003. The fasciolariid gastropod genus *Benimakia*: New species and a discussion of Indo-Pacific genera in Brazil. Proceedings of the ANSP 153:15–22.

VERMEIJ, G. J. & M. A. SNYDER. 2006. Shell characters and taxonomy of *Latirus* and related fasciolariid groups. Journal of Molluscan Studies 72:413–424.

VERRILL, A. E. 1907. The Bermuda Islands, part 4, geology and paleontology, and part 5, an account of the coral reefs. Transactions of the Connecticut Academy of Natural Sciences 12(2):45–348, 37 pls.

WALLER, T. R. 1973. The habits and habitats of some Bermudian marine mollusks. The Nautilus 87(2):31–52.